Examiner. Accordingly, claims 1-14 are believed to be in condition for allowance for at least the reasons provided below and the amendments set forth above.

Referring now to the detailed Office Action, claims 1-8 and 11 are rejected under 35 U.S.C. §103(a) as unpatentable over Zhang (U.S. Patent No. 5,904,509). Further, claims 9-10 and 12-14 are rejected under 35 U.S.C. §103(a) as unpatentable over Zhang in view of Miyasaka (U.S. Patent No. 6,455,360).

In response to the rejection of independent claims 1-3 over Zhang, Applicants have amended independent claims 1-3, 13, and 14 to further specify that the ion doping of an impurity element is directed to a channel region. Zhang does not teach or suggest adding impurity element into a channel region as shown in Figs. 1-3, 5 and 6. Hence, amended claims 1-3, and their respective dependent claims, are distinguishable over Zhang.

With respect to the rejection of claims 9-10 and 12-14 over Zhang and Miyasaka, similarly to Zhang, Miyasaka does not teach or suggest adding impurity in a channel region, as Miyasaka teaches using gate electrode as a mask while adding an impurity element as disclosed in col. 22, lines 25-37.

Moreover, with respect to the Examiner's assertion that Miyasaka discloses performing a doping step using diborane diluted with hydrogen at a concentration of 0.1 to 10% as shown in col. 22-lines 37-41, Applicants respectfully submit that the Summary of the Invention of the present specification recognizes that a source gas <u>conventionally</u> used for doping is diborane diluted with hydrogen at a concentration of 0.1% ("0.1% diborane"). Furthermore, 0.1% diborane is not suitable for the purpose of the present invention, which is improving TFT characteristics such as threshold value according to reducing concentrations of ambient atmospheric components (C, N, O). Applicants respectfully submit that 0.5-5% diborane, as recited in claim 14, for example, is suitable for such purpose of the present invention.

Applicants respectfully assert that Miyasaka does not recognize the problem of the ambient atmospheric components (C, N, O) in the TFT characteristics because 0.1-10% diborane disclosed by Miyasaka includes unsuitable range for the purpose of the present invention.

Hence, the combination of Miyasaka with Zhang would be improper in the rejection of claims 9-10 and 12-14.

In view of the amendments and arguments set forth above, Applicants respectfully request reconsideration and withdrawal of all pending rejections.

Having responded to all rejections set forth in the outstanding Office Action, it is submitted that the claims 1-14 are now in condition for allowance. An early and favorable Notice of Allowance is respectfully solicited. In the event that the Examiner is of the opinion that a brief telephone or personal interview will facilitate allowance of one or more of the above claims, the Examiner is courteously requested to contact Applicants' undersigned representative.

Respectfully submitted,

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MARKED-UP VERSION OF THE AMENDED CLAIMS

1. (Amended) A method of manufacturing a semiconductor device comprising the step of:

ion-doping an impurity element into a [semiconductor film] channel region,

wherein said impurity element imparts n-type conductivity or p-type conductivity to said semiconductor film,

wherein a concentration of said impurity element is in the range from 1×10^{15} to 5×10^{17} atoms/cm^3 in said semiconductor film after the step, and

wherein a concentration of carbon is at 3×10^{17} atoms/cm^3 or less in said semiconductor film after the step.

2. (Amended) A method of manufacturing a semiconductor device comprising the step of:

ion-doping an impurity element into a [semiconductor film] channel region,

wherein said impurity element imparts n-type conductivity or p-type conductivity to said semiconductor film,

wherein a concentration of said impurity element is in the range from 1×10^{15} to 5×10^{17} atoms/cm^3 in said semiconductor film after the step, and

wherein a concentration of nitrogen is at 1×10^{17} atoms/cm^3 or less in said semiconductor film after the step.

3. (Amended) A method of manufacturing a semiconductor device comprising the step of:

ion-doping an impurity element into a [semiconductor film] channel region,

wherein said impurity element imparts n-type conductivity or p-type conductivity to said semiconductor film,

wherein a concentration of said impurity element is in the range from 1×10^{15} to 5×10^{17} atoms/cm^3 in said semiconductor film after the step, and

wherein a concentration of oxygen is at 3×10^{17} atoms/cm^3 or less in said semiconductor film after the step.

13. (Amended) A method of manufacturing a semiconductor device comprising the step of:

ion-doping an impurity element into a [semiconductor film] <u>channel region</u>,

wherein said impurity element imparts n-type conductivity or p-type conductivity to said semiconductor film,

wherein a concentration of said impurity element is in the range from 1×10^{15} to 5×10^{17} atoms/cm^3 in said semiconductor film after the step, and

wherein a concentration of hydrogen is at 1×10^{19} atoms/cm^3 or less in said semiconductor film after the step.

14. (Amended) A method of manufacturing a semiconductor device comprising the step of:

ion-doping an impurity element into a [semiconductor film] <u>channel region</u>,

wherein said impurity element imparts n-type conductivity or p-type conductivity to said semiconductor film,

wherein a concentration of said impurity element is in the range from 1×10^{15} to 5×10^{17} atoms/cm^3 in said semiconductor film after the step, and

wherein said impurity element is doped into said semiconductor film by using a source material gas containing said impurity element diluted with hydrogen to the concentration in the range from 0.5% to 5%.